

WHAT IS CLAIMED IS:

1. A control circuit of a DC-DC converter that generates either one of a step-down control signal and a  
5 step-up control signal, the control circuit comprising:

a switch circuit for outputting either one of the step-down control signal and the step-up control signal in response to a switching signal; and

10 a switching signal generation circuit connected to the switch circuit for generating the switching signal using a duty setting signal, which controls either one of the step-down control signal and the step-up control signal.

15 2. The control circuit according to claim 1, wherein the switching signal generation circuit compares the voltage of the duty setting signal with a reference voltage to generate the switching signal.

20 3. The control circuit according to claim 1, wherein the switching signal generation circuit compares the voltage of the duty setting signal with the maximum voltage of a triangular wave signal to generate the switching signal.

25 4. The control circuit according to claim 1, further comprising:

a duty setting signal generation circuit for generating the duty setting signal in accordance with a digital setting signal.

30 5. The control circuit according to claim 4, wherein the duty setting signal generation circuit includes:

a decoder circuit for decoding the digital setting signal to generate a decoded signal; and

an analog voltage generation circuit connected to the decoder circuit for generating the duty setting signal in accordance with the decoded signal.

5           6.    The control circuit according to claim 4, wherein the duty setting signal generation circuit includes:

          a comparator for comparing an input voltage and an output voltage of the DC-DC converter to generate a comparison signal; and

10           an analog voltage generation circuit connected to the comparator for generating the duty setting signal in accordance with the comparison signal.

          7.    A control circuit of a DC-DC converter comprising:

15           a first PWM comparator for comparing an input signal, a duty setting signal, and a triangular wave signal to generate either one of a first step-down control signal and a first step-up control signal;

20           a second PWM comparator for comparing the input signal and the triangular wave signal to generate either one of a second step-down control signal and a second step-up control signal;

25           a switch circuit connected to the first and second PWM comparators for outputting either the first and second step-down control signals or the first and second step-down control signals in response to a switching signal; and

          a switching signal generation circuit connected to the switch circuit for generating the switching signal using the duty setting signal.

30           8.    The control circuit according to claim 7, wherein the switching signal generation circuit compares the voltage of the duty setting signal with a reference voltage to

generate the switching signal.

9. The control circuit according to claim 7, wherein the switching signal generation circuit compares the voltage  
5 of the duty setting signal with the maximum voltage of the triangular wave signal to generate the switching signal.

10. The control circuit according to claim 7, further comprising:

10 a duty setting signal generation circuit for generating the duty setting signal in accordance with a digital setting signal.

11. The control circuit according to claim 10, wherein  
15 the duty setting signal generation circuit includes:

a decoder circuit for decoding the digital setting signal to generate a decoded signal; and

an analog voltage generation circuit connected to the decoder circuit for generating the duty setting signal in  
20 accordance with the decoded signal.

12. The control circuit according to claim 10, wherein the duty setting signal generation circuit includes:

a comparator for comparing an input voltage and an  
25 output voltage of the DC-DC converter to generate a comparison signal; and

an analog voltage generation circuit connected to the comparator for generating the duty setting signal in accordance with the comparison signal.

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13. A DC-DC converter including a step-down circuit for decreasing an input voltage to generate a step-down output voltage or a step-up circuit for increasing the input

voltage to generate a step-up output voltage, the DC-DC converter comprising:

a control circuit connected to the step-down circuit or the step-up circuit for generating either one of a step-down control signal, which controls the step-down circuit, or a step-up control signal, which controls the step-up circuit, wherein the control circuit includes;

a switch circuit for outputting either one of the step-down control signal and the step-up control signal in response to a switching signal; and

a switching signal generation circuit connected to the switch circuit for generating the switching signal using a duty setting signal, which controls the duty of either one of the step-down control signal and the step-up control signal.

14. The DC-DC converter according to claim 13, wherein the switching signal generation circuit compares the voltage of the duty setting signal with a reference voltage to generate the switching signal.

15. The DC-DC converter according to claim 13, wherein the switching signal generation circuit compares the voltage of the duty setting signal with the maximum voltage of the triangular wave signal to generate the switching signal.

16. The DC-DC converter according to claim 13, wherein the control circuit further includes:

a duty setting signal generation circuit for generating the duty setting signal in accordance with a digital setting signal.

17. The DC-DC converter according to claim 16, wherein

the duty setting signal generation circuit includes:

a decoder circuit for decoding the digital setting signal to generate a decoded signal; and

an analog voltage generation circuit connected to the  
5 decoder circuit for generating the duty setting signal in accordance with the decoded signal.

18. The DC-DC converter according to claim 16, wherein the duty setting signal generation circuit includes:

10 a comparator for comparing an input voltage and an output voltage of the DC-DC converter to generate a comparison signal; and

an analog voltage generation circuit connected to the comparator for generating the duty setting signal in  
15 accordance with the comparison signal.

19. A method for controlling a DC-DC converter including a step-down circuit or a step-up circuit, the method comprising the steps of:

20 generating either one of a step-down control signal, which controls the step-down circuit, or a step-up control signal, which controls the step-up circuit;

generating a switching signal using a duty setting signal, which controls the duty of either one of the step-  
25 down control signal and the step-up control signal; and

providing either one of the step-down control signal and the step-up control signal to the associated step-down circuit or step-up circuit in response to the switching signal.